Quadrupolar Order in Quantum Spin Ice NIC SHANNON, MATHIEU TAILLEFUMIER, Okinawa Institute of Science and Technology Graduate University, OWEN BENTON, RIKEN, LUDOVIC JAUBERT, Okinawa Institute of Science and Technology Graduate University — Quantum effects in spin ice can be modelled using an XXZ model on the pyrochlore lattice. For unfrustrated interactions, $J_\pm > 0$, this model is accessible to quantum Monte Carlo simulations, and supports a quantum spin liquid ground state for $0 < J_\pm \sim 0.05J_{zz}$. Here we present a study of this model for frustrated interactions, $J_\pm < 0$, using a combination of classical Monte Carlo and semi-classical molecular-dynamics simulations. We find that, for $J_\pm < -0.5J_{zz}$, the spin liquid gives way with a phase with hidden quadrupolar order.

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Date submitted: 11 Nov 2016

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